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ABSTRACT

The role of computing in enhancing scholarly writing and in building student writing skills is examined, with particular reference to the social scientist's needs at the college level. Word processing, outlining, and hypertext software types are appraised in terms of their impact on writing processes, and, while strengths of each are noted, each is found to be limited in relation to organizing ideas, which is a critical aspect of writing in the social sciences and other areas. Software that is more salient to writing objectives requires an integration of database with word processing software. The management of "ideabases" is identified as the basis for a new type of software of this integrated type. Software designed by this author for classroom purposes is described. "The Writer," which is available for IBM compatible computers, allows the student or scholar to develop and work with an outline and store notes in a database that can be transferred into the final product. There are four menus that include main, note, outline edit, and output menus, and these menus and examples of their use are reproduced in this document. A 27-item bibliography is included. (Author/DJC)

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Computer Enhancement of Student and Scholarly Writing in Social Science

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Computer Enhancement of Student and Scholarly Writing in Social Science

ABSTRACT

The role of computing in enhancing scholarly writing and in building student writing skills is examined, with particular reference to social science needs at the college level. Word processing, outlining, and hypertext software types are appraised in terms of their impact on the writing process and while strengths of each are noted, each is found to be limited in relation to organizing ideas, which is held to be a critical aspect of writing in social science and other areas. Software more salient to writing objectives requires an integration of database with word processing software. The management of "ideabases" is set forth as the basis for a new type of software of this integrated type. Software designed by the author for classroom purposes of this type is described (The Writer).

Keywords: Writing, word processing, database management, social science, hypertext, ideabases

Computer Enhancement of Student and Scholarly Writing in Social Science

The use of computing in writing has a shaky image, associated as it has been for a long time with endless "personalized" form letters and the like (U. S. News and World Report, 1978). When social scientists think about computers and enhancement of student and scholarly writing, they are apt to think of the boon represented by word processing, but that is about all they associate with computing and writing.

Nonetheless, Compaine (1983) and others have argued that the trend toward computing literacy is following the pattern of earlier changes in the definition of "literacy". The process -- whether in oral tradition, print, or computers -- begins with specialists, has a broader effect upon social institutions, and finally becomes a dominant medium available to all. While computing skills beyond word processing are now largely in the hands of specialists, it may not always be so. In this view, computer skills will come to augment, not replace, writing skills. There is now widespread agreement that computing is doing just that, but there is disagreement about how computer software is best designed to accomplish this purpose.

The merits of word processing over typing is no longer an issue. In practical terms, most social scientists who write extensively do so with word processors and the immediate issues they face have to do with how to acquire supporting peripherals such as better, preferably laser printers and mass hard disk storage. Some understand the power of online access to bibliographic searching and have come to regard it as indispensable (Garson, 1986, 1987). Few, however have considered how the foremost powers of computing, which have to do with database management, can enhance scholarly writing and prove useful in doing something about the much-lamented problem of how to improve student writing skills.

Some may consider it not the province of a social scientist to take responsibility for enhancing student writing skills. I am of the opposite view, holding that writing is something to be integrated across the curriculum. As an instructor of computer applications in social science I have been impressed with the excitement students enjoy from seeing how a few hours invested in learning word processing leads to great efficiencies in writing. But I am also impressed that efficiency is not effectiveness. Word processing alone does too little to improve writing skills to be to be expected changes which would meet my colleagues' complaints about student writing.

Scholarly Writing and Word Processing

Word processing has already made deep inroads in the way scholarly writing is done. There is already a significant literature on the subject (cf. Auten, 1984; Schwartz and Bridwell, 1984; MacArthur, 1988). To word processing software must be added a variety of extensions, such as spelling and style checkers, thesauri, and telecommunications links. Writing-pad software and cut-and-paste note-taking software is now common, not only in this country but internationally as well (Pershin, Shishlov, and Yurkov, 1986). Now, of course, desktop publishing is further revolutionizing the process by allowing publications-quality report writing without the need for recourse to "outsiders". Desktop publishing is even said by some to improve writing skills since the improved appearance of output is motivational (McCarthy, 1988).

Word processing has been found to lead to writing more, revising more, and sharing writing results more. There is considerable evidence that word processing improves writing by facilitating the revision process. Whereas typed manuscripts encouraged editing rather than rethinking and revision, word processing makes the latter, superior course much more realistically feasible (Grow, 1988). Making the revision process easier, in turn, has broad implications for how students look at collaboration in writing efforts (Crawford, 1988). Farrell (1987), for example, has found that among peer tutors and writers in a college writing lab, while working with the computer, the varying social, ethnic, and educational backgrounds of the

participants "vanished" and a new relationship developed. Word processing can be associated with increased collaboration in writing in classroom situations, if instructors provide for and encourage this.

Word processing, wonderful as it is, has its limits (Davis, 1988). Mullins (1988), for example, found that an experimental group using word processors did not differ significantly from a control group using manual writing tools.[1] While word processing can improve writing by making revision easier, it tends toward the efficiencies of editing corrections. Effectiveness requires challenging the writer to revise not in the sense of copy editing but in the sense of rethinking and reorganizing. There is nothing inherent in the nature of word processing which does this.

Word Processing, Outlining, and Hypertext

Two new genres of writing-related software have attempted to address issues of organization in writing. "Outliners" take the direct approach and address the brainstorming or invention stage of writing. "Hypertext" takes a relational approach, seeking a non-linear form of organizing ideas. I believe each is on the right track, that of seeking to transcend word processing alone, but each has its own limitations.

Outliners, such as PC-Outline (Button Software) and ThinkTank (Living Videotext), help students organize the writing process, as do brainstorming and invention-stage software such as Pre-Writing (National Collegiate Software

Clearinghouse). Invention software can prompt the student or scholar to consider various possible dimensions of the subject (e.g., values, quantity, quality, direction), and outliners can be used to draft organization plans, then redraft them after discussion. Outlining is now a built-in feature of leading word processors such as WordPerfect.

Hypertext is a system whereby related texts (and sound and graphics) can be linked so that relationships may be explored in a nonlinear manner (Smith, 1988). An example is PC-Hypertext (from MaxThink, which also produces the related HyperLink and Houdini packages). Hypertext has already been applied successfully in college writing courses (Kinnell, 1988). It is also the basic concept for several course authoring packages, such as Icon-Author (Aimtech). Hypertext challenges the writing to find relationships and linkages between items in the main outline and body of the manuscript and other manuscripts, notes, or even audio and visual materials.[2] Hypertext is thus a sort of ultimate cross-reference system, with all that implies for thinking about the organization of one's written work.

Without taking away from their importance and utility, it may be noted that both outliners and hypertext have problems from the point of view of enhancing scholarly writing and improving student writing skills. In essence, outliners come "too early" in the crucial stage of organizing ideas, while hypertext comes "too late". This is not to say that either type of software might not prove invaluable to scholars, only that neither is designed for what is most needed.

Outliners are designed to be used during the initial brainstorming stage of writing, assisting the user to come up with the various dimensions of the topic and to experiment freely with various possible modes of organization. In actual use, the writer then uses a word processor to do the writing. When outlining is built into the word processor, reorganization is easier since the text can be moved along with the outline headings, which renumber automatically. Nonetheless, while the writer could go back an use the outliner or word processing outline feature again, reorganizing his or her word processing files accordingly, there is nothing inherent in the software prompting the user to do so. It is an extra step to be accomplished at the will of the writer for reasons not arising from any process associated with outlining software. In practice, particularly in student settings, this means that the outliner is used once at the beginning to organize ideas, then is left behind throughout writing process. It is in this sense that outliner functions, though very important, come "too early" from the point of view of improving writing skills.

Hypertext also is not without its problems as pointed out, for example, in Marchionini's (1988) study of Hyperties and the Electronic Encyclopedia, which highlighted the pitfalls of finding facts and browsing in such systems. From a reader viewpoint, just as people tend to skip over prefaces, appendices, and footnotes, so there is reason to question the extent to which elaborate cross-references are appropriate. People may not like non-linear thinking. It is easy to become confused when wandering among several layers of cross-references. From an authoring

viewpoint, the creation of a rich system of cross-references is a staggering task. Hypertext raises expectations that many writers will not wish to meet.

From a writing enhancement and skill-building viewpoint, moreover, hypertext may distract from and even undermine important fundamentals on which good writers concentrate: a clear theme with an easily-understood organization leading from premises to conclusions. Only after such a firm foundation is completed is an overlay of rich cross-references, such as hypertext represents, an appropriate objective. It is from this viewpoint that hypertext comes "too late" in the writing process.

Management of Ideabases: Software as a Pre-processor for Writing

Word processing, outlining, even hypertext are all enhancements of the writing process. What is missing, however, is software which focuses on the organization of ideas in relation to how social scientists actually work. The capabilities of computer software are far in excess of professionals' capacity to find the time and resources to take advantage of it. For example, in spite of need for research being cited as a primary problem and in spite of the availability of full-text databases providing research answers, a study by Kinnell (1987) found news editorial writers did not take advantage of it in spite of awareness. If software does not correspond to the way professionals actually work, however technologically sophisticated it may be it may not be used extensively.

What is the writing style which corresponds to the way social scientists

actually work? There is no one style; opinions about what is best vary. As a generalization, however, it may be said that word processors are designed for linear thinking: start at the beginning, write to the end. Outliners are somewhat similar: pre-determine your organization, then write. Hypertext, however, is non-linear: identify your cross-references as you go along. In contrast to these presumed styles is one which I perceive to be typical of the way social scientists actually work: start with a basic outline but with many of the details missing, and probable need to reorganize; encounter bits and pieces of relevant information in the form of readings and data; make mental connections (concepts) related to one or another aspect of one's work, but not in any particular order; do all of this over a relatively long period of time. Keep reorganizing as you go.

As one desires to integrate writing about readings, data, and concepts into the manuscript project, one perceives the need to reorganize. Let me call the notes one makes about readings, data, and concept by the term "ideas". As ideas arise, the writer finds that some do not fit in the pre-conceived outline. New topics must be added as one goes along. One finds some do not fit in the same category with others: the category proves multi-dimensional and must be relabelled and split. Some ideas have to be forced into the nearest conceptual outline heading, and the writer soon sees the need to change the outline. Some outline categories may prove to have no ideas and need to be dropped. These and similar considerations illustrate a central fact about writing, at least for social scientists: organization arises from ideas

generated from the encounter over time with readings, data, and concepts.

If one accepts this understanding of the writing process, then the kind of software which would help would have three main functions: (1) it would be a database for notes on ideas (an ideabase), such that the writer could enter notes on any topic in any order; (2) it would relate notes to a modifiable outline, allowing additions to the outline "on the fly" as notes are entered; (3) it would assemble the notes in appropriate form for final word processing, yet you could read the manuscript-to-date at any time, on the screen or in print; (4) it would do other chores like providing an automatic table of contents, index, and bibliography; and (5) the notes and bibliography databases would be reusable for other writing projects later on.

The idea of relating database software closely to writing software is not new. Social scientists have long used databases as part of the writing process, but only for the actual data portion as, for example, in the use of SPSS Report Writer (Hodgson and Chilvers, 1982). Irish (1987) is another social scientist who used databases for survey information used by students in writing reports. Nor is the concept of using database software to "write" draft manuscripts and new one: compare documentation-writing software, which facilitates the process of preparing manuals for computer programs (see Walker, 1984).

While word processing and database management usually are perceived as two quite distinct types of software, actually there is a close relationship. Both require the

same kind of conceptual creativity in organizing ideas. This may be unsurprising in view of studies which show a linear predictive relationship between cognitive development and verbal reasoning with programming ability, an ability more often associated with database design processes (Cafolla,1988).

In fact, some experts in the field of adult literacy have concluded that word processing and database programs are better suited to learning fundamental literacy than are "reading" software programs (Young and Irwin, 1988). Database programs are integral to certain types of creative writing, such as interactive fiction, which has been used successfully even with elementary school students (Newman, 1988). Of broader import, outlining, idea generation, and other "invention" software aid to the writing process are, at their core, database management programs (Langston, 1987). What is proposed in this paper is not really new, only a different type of database application to writing processes.

One reason why databases are closely related to the writing-organizing process is because "notes" as elements of a manuscript correspond to "records" as elements of data files. Note taking is fundamental to development of creative writing skills. An example is the "Clipping Thesis" project developed by Minnich and McCarthy (1986), requiring students to find newspaper and journal articles through online searching or in print, and write brief summaries. Tate (1986) also has called attention to the usefulness of computing in the note-taking and note-organizing stage, although he found existing software for this purpose problematic.

Developing "The Writer" for Computer Enhancement of Student and Scholarly Writing

To implement the analysis contained in this paper I developed a program which would accomplish the purposes needed for a package which was an ideabase manager designed for enhancement of student and scholarly writing. This was then tested successfully in a classroom setting but since there was no control group, results are not reported here nor claimed. Instead this section provides a brief description of The Writer program as a way of providing a concrete illustration of the type of software which I believe could be effective in improving student writing skills. It is not claimed that The Writer is the ideal representation of the concept since full development of a major software concept requires large scale funding which goes far beyond the prototyping capabilities of a faculty author. Nonetheless, I believe that "The Writer" illustrates the concepts involved and can be used effectively in the writing process.[3]

The Writer is designed for those who have ever wished their computer would write manuscripts for them. It won't, of course, but The Writer program comes as close to it as one can reasonably get. The user enters an outline of what he or she wants the manuscript to become (the outline may be changed later as much as desired). Then as ideas come to the writer, as he or she takes notes from other reading matter, gathers data or case illustrations, notes are entered into The Writer

database. Entry of notes works very much like one's word processor. The user also enters reference sources that go with the notes and enters keywords that describe them. This need not be done in any particular order - just whenever the writer is so inspired.

At any time The Writer can print out the table of contents, the body of the manuscript in proper outline order, a keyword index to the manuscript, and a bibliography (with or without annotations). The user can preview any or all of these on the screen, send a draft to the printer, or send everything to a text file for final handling by a word processor. Of course, everything entered in The Writer database is, by definition, in a database. This means that unlike a word processing files, it is easy to assemble notes and associated references and keyword descriptors into the basis for new manuscripts. For those proficient in databases, The Writer uses database files that are fully dBASE compatible and don't require conversion.

There are many potential purposes for a program like The Writer:

* To assemble research notes into a draft manuscript.
* To assemble field notes into a report.
* To allow creative notes of free text to be organized into a coherent whole.
* To serve as an outliner, allowing drafting and redrafting of an outline, carrying along with any redrafts the associated notes.
* To manage one's bibliography.

* To manage one's "cardfile" of research notes.
* To allow multiple authors, as in a classroom situation, to contribute piecemeal to a single manuscript, or simply to use a note-taking approach to the writing process, allowing repeated outline revision as notes are assembled into whole.

The Writer program will be referred to as "TW" for the remainder of this essay. After starting TW by typing "GO", the user sees the TW main menu:

THE WRITER: MAIN MENU

No Book Title Set Yet

A. Add/Edit/Delete Notes

B. Add/Edit/Delete Sources

C. Add/Edit/Delete
Chapters/Sections/Subsections/Sub-subsections

D. Create New Book Disk

E. Output Options

F. Utilities

G. Set Screen Colors

Q. Quit

The general procedure in TW is to start with Option C, which is where the user enters the outline for the manuscript. The user can add to or change the outline by selecting Option C at a later time, or when entering notes the user may add a new outline heading on the spot. After the outline is started, Option A is chosen to add the notes themselves. Each time the user adds a note the user has a chance to add associated keywords or reference sources. Finally, Option E is chosen for output to screen (for previewing), printer (for rough drafts), or text file (for final edit and printing using a word processor).

Selecting Option A leads to the NOTES menu:

THE WRITER: NOTES MENU

Book Title Not Set Yet

A. Add Notes

B. Edit Notes

C. Delete Notes

Q. Quit to main menu

Space for Approximately 4453 more notes.

NOTES Option A will brings the user to the Notes Data Entry Screen, shown below:

The Writer: Notes Data Entry Screen

Record Number 1

Enter location for note (enter 0 if not applicable):

Chapter: 1 **Section:** 1 **Subsection:** 0 <R> **Sub-subsection:** 0 <R>

Name of note contributor: <R> **Sequence number:** 1000 <R>

Source (ex:Smith, 1987a): Browning, 1989

Pages: 222-223

Enter up to five descriptor keywords:

Keyword 1: marriage

Keyword 2: child-rearing

Keyword 3: employment

Keyword 4:

Keyword 5:

Note Type: 1

1 = narrative; 2 = quotation with commentary;

3 = quotation; 4 = case study; 5 = definition;

6 = table/fig.; 7 = test items; 8 = annotated bibliography

In the sample screen above, boldface text is put on the screen by the computer. Text not in boldface is sample entries by a user. <R> signifies the <RETURN> or

<ENTER> key[1]; this accepts the default value, such as 1000 for the SEQUENCE NUMBER.

The data entry screen has the following fields:

CHAPTER: SECTION: SUBSECTION: SUB-SUBSECTION:	Here the user wants the note to go in section 1.2. The user must have entered an outline first. It is helpful to use Main Menu Option E to get a copy of the outline (table of contents) for reference.
NOTE CONTRIBUTOR:	Useful only if multiple users are adding notes to the same Writer database, as in a classroom situation. Usually would be omitted by typing <R>. Note this field is **not** the reference source.
SEQUENCE NUMBER:	A number between 0000 and 9999, with 1000 being the default. The lower the number, the earlier the note will go in the given outline category (here, Section 1.2). If all notes have the same sequence number (e.g., 1000) then notes will appear in the order entered and will have to be rearranged, if desired, on one's word processor after text file output from TW.
SOURCE:	This is the citation in the form Smith, 1987. Another example would be Smith, Jones, and Brown, 1988b. The SOURCE is the reference source of the note. The note itself may cite other references. These must be entered later by selecting Main Menu Option B (Add/Edit/Delete Sources). Thus a note may be original to the user and have not SOURCE, but it may still cite other references which the user enters under Option B.

[1] In this manual <R> is equivalent to the <RETURN> key, which is equivalent to the <ENTER> key.

PAGES:	This is the page location of the note (e.g., for quotations), if any. Note this is **not** to be used for the page range of an entire article in a journal; the page range is entered later with the full source reference, discussed below.
KEYWORD (1 to 5):	You may enter up to five keyword descriptors for the note.
NOTE TYPE:	Usually the type is 1 (narrative). If unsure, select 1. Other choices will affect how the output is interpreted: 2 = quotation with commentary assumes the quotation is in note field 1 and the commentary in note field 2 (see the discussion below); 3 = quotation assumes the quotation is in note field 1; 4 = case study (you may use all three note fields but the section will be set off as a 'Case Study'); 5 = definition (assumes note field 1 is the definition and fields 2 and 3 are the commentary, if any); 6 = table/fig. (will be labeled as such); 7 = test items (assumes the question and choices are in note field 1, the answer in note field 2, and the commentary in note field 3); 8 = annotated bibliography (assumes the citation is in note field 1 and the annotation in note field 2; however, it is better to keep bibliography and annotations in the Sources database rather than the Notes database).

After entering the last keyword (or typing <ENTER> if none are wanted), the user will come to the second Notes Data Entry Screen, where the actual text of the note is entered. This screen contains three note fields, labelled MEMO 1, MEMO 2, and MEMO 3 respectively. Each can contain up to 5,000 characters of text. Each works like a word processing document and most keys (arrows, delete, insert, caps lock) work as one would expect. While one is in a text entry field, it will scroll to

allow more area in which to write. What appears on the screen is only a window into the text area. The user has **much** more writing area than the few lines that show on the screen at any given time. It is also possible to pull text into a note field from a previously-saved file.

TW will take the SOURCE listed on data entry screen 1 and see if it is already in the SOURCES database. If it is, TW will display a little information about it and ask the user to confirm it is the one wanted. However, if TW cannot find the source the user will be asked to enter it if you have listed one. TW does not support underlining or titles directly because various word processors handle underlining differently, and TW is meant to be compatible with almost any word processor. To produce underlining, the user enters the special characters his or her word processor uses.

Later, or course notes and sources may be edited or deleted, as may the various outline headings created at the outset or as notes are entered. The Outline Edit Menu is as follows:

THE WRITER: OUTLINE EDIT MENU

Book Title Not Set Yet

A. Add/Edit/Delete Chapter/Section Headings

B. Insert a Chapter/Section Heading

C. Switch To Chapter/Section Headings (not Notes)

D. Move a Chapter/Section Heading (and its Notes)

E. Empty Notes rom On Heading, Assign to Another

Q. Quit to main menu

In addition to adding, editing, and deleting outline headings and their corresponding notes (Option A), the user may insert new headings (Option B), switch headings (Option C), or more a heading and its dependent subsections to another location (Option D). Finally, notes may be transferred in block to other outline sections while the outline remains unchanged (Option E). A new manuscript may also be started retaining selected, all, or no existing notes and bibliographic sources.

The Output Menu provides for output to screen for preview, to printer for draft editing, or to text file for final editing with a your word processor and final printout. TW is not intended for final manuscript printout and lacks many of the features of word processors like WordPerfect. It is strongly recommended that when the

manuscript contains most or all of the notes that are to be entered, then the user should print everything to text file and use his or her word processor for final arrangement, editing, and printout.

THE WRITER: OUTPUT MENU

Book Title Not Set Yet

A. Set output for book portion only
(for options B, C, or D)
B. Output table of contents
C. Output book or portion
D. Output keyword index
E. Output reference source bibliography
F. Output annotated bibliography
G. Output notes file codebook
Q. Quit

TW will print out the table of contents (outline), the manuscript itself, the index, and the bibliography for the entire manuscript or for a selected range (e.g., a chapter). The manuscript-to-date may be output at any time. Codebooks can also be printed to list, for example, the notes as entered, by outline heading topic, by keyword, or

alphabetically by bibliographic source. Finally, the database records can be selected in a variety of ways and written to a new file, or records in another file can be imported.

Summary

Credit (or blame) for writing belongs with the writer, not the writer's tools. Computer software for the enhancement of writing can only go so far. Of the various computer tools, word processing will not and should not be replaced by newer genres, including that advocated here. Some of the extensions to word processing, such outliners and hypertext, are highly useful and they, together with word processing itself, have some beneficial effects on the writing process. However, at least for social scientists, it is argued above that the critical aspect of the writing process has to do with how ideas are organized. The friction of the encounter of new ideas with preconceived frameworks or outlines is the prompt to the writer for rethinking and reorganizing, and that is crucial to improving writing skills.

These premises in turn lead to the perception that word processing, outliners, and hypertext are not sufficient for enhancement of the writing process. What is needed is database management software designed for the management of ideas (ideabases) and closely integrated with word processing and its extensions. A working prototype, The Writer, was developed to illustrate the general nature of the proposal. If the prototype seems of interest to other scholarly writers and the students to whom

they are trying to teach writing skills, much more powerful and versatile programs based on the same assumptions could be developed.

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1. Of course, as Mullins acknowledges, word processing is now so widespread such experiments may be undermined because of difficulties in establishing a true control group.

2. While hypertext is not yet a built-in feature of word processors, leading packages such as WordPerfect do support functionally related features like automatic indexing, automatic page reference renumbering, and text and graphics windows. Add-on software allows relational use of word processing with database and spreadsheet files.

3. "The Writer" is available for IBM compatible computers with at least 384K RAM and DOS 3.3 or higher. A hard disk and a printer are strongly recommended. Cost is $35 from the National Collegiate Software Clearinghouse, School of Humanities and Social Sciences, NCSU Box 8101, Raleigh, NC 27695. Telephone: 919-737-3067.